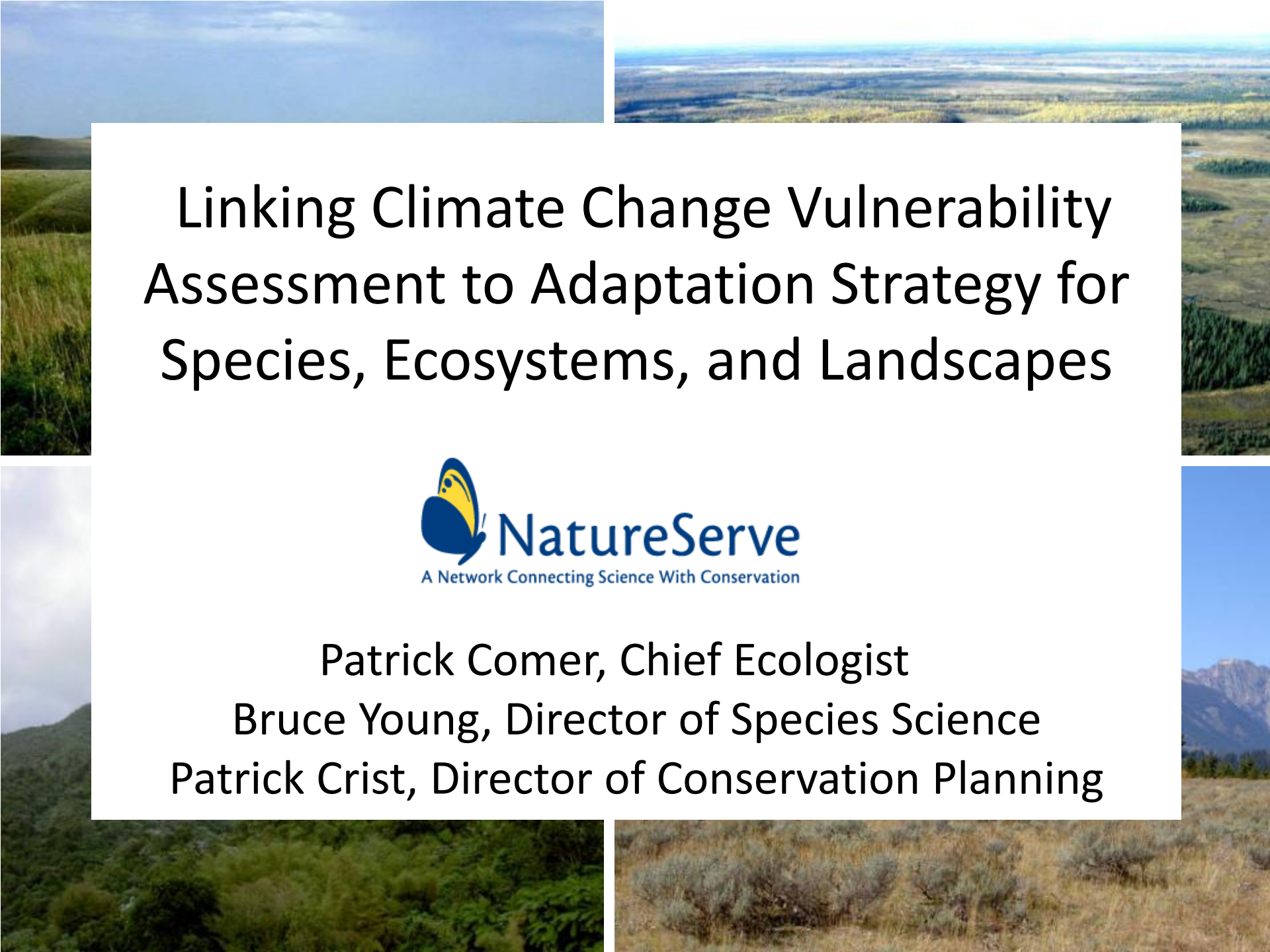

Linking Climate Change Vulnerability Assessment to Adaptation Strategy for Species, Ecosystems, and Landscapes

NatureServe
A Network Connecting Science With Conservation

Patrick Comer, Chief Ecologist
Bruce Young, Director of Species Science
Patrick Crist, Director of Conservation Planning

Climate Change Vulnerability Assessment and Adaptation Strategy

levels of ecological organization

Issues and Questions for this Session

- What do we need from vulnerability assessments to best inform adaptation strategies for biodiversity?

➢ Species: we cannot adequately assess all species individually

- *What might be practical selection criteria to consider?*

Issues and Questions for this Session

- Regions & Landscapes: We need sufficient specificity to inform strategies

  - *What types of strategies are well-informed by regional landscape assessment*?

Issues and Questions for this Session

- For any given area, what might be a robust combination?
  - Landscapes
  - Communities
  - Species

Climate Change Vulnerability Assessment and Adaptation Strategy

Lessons Learned from the Climate Change Vulnerability Index: The First Three Years

Bruce Young

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NatureServe

Thanks

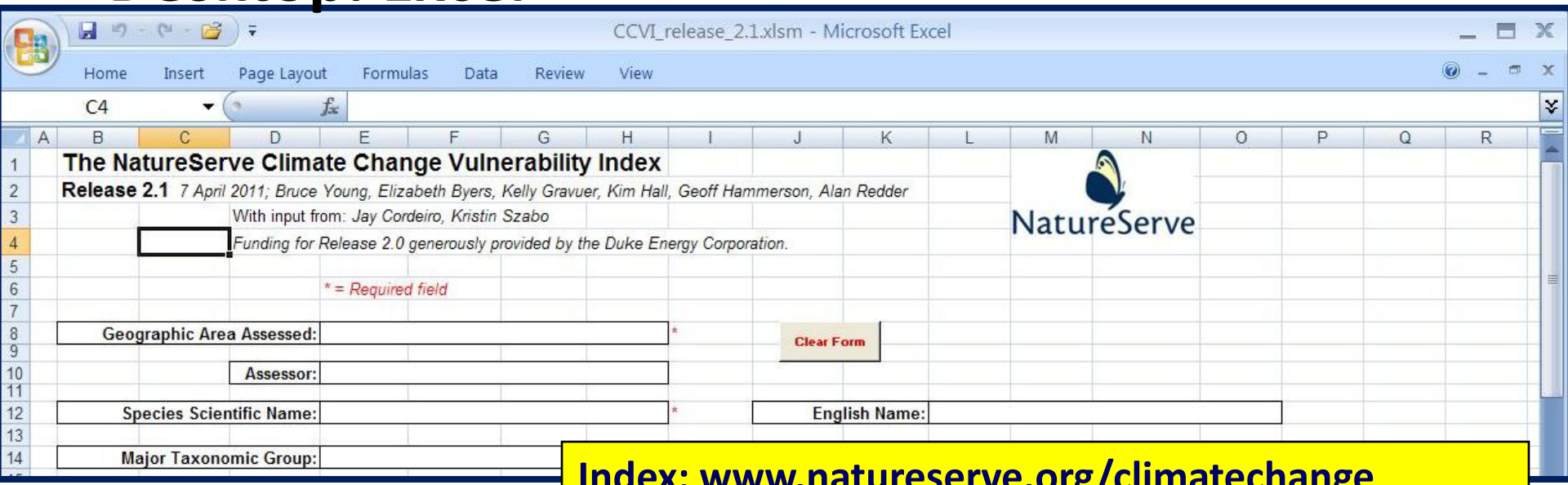
Co-developers

- Elizabeth Byers
- Kelly Gravuer
- Kim Hall
- Geoff Hammerson
- Alan Redding

Users

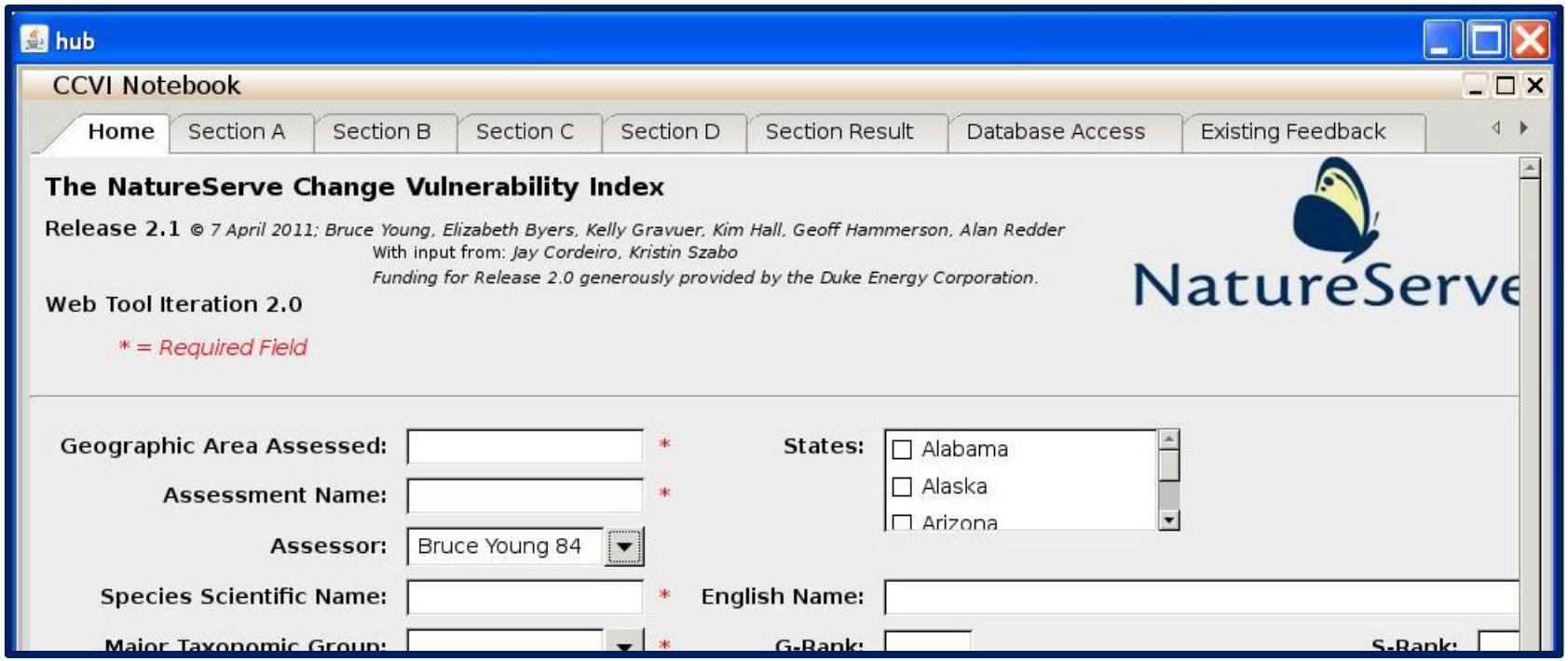
- Elizabeth Byers
- Matt Schlessinger
- Kristin Szabo

Desktop: Excel

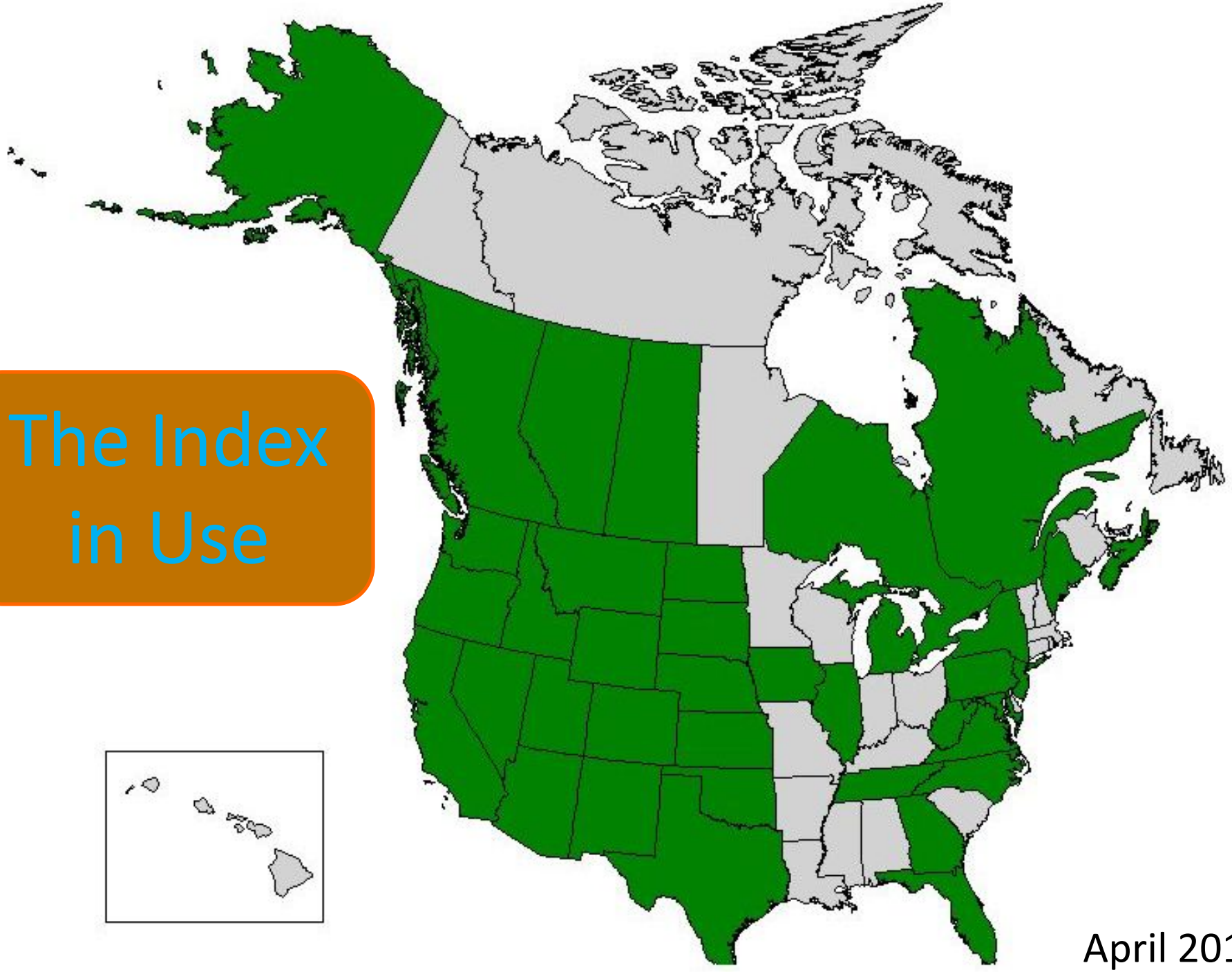


Index: www.natureserve.org/climatechange

Online: adapt.nd.edu

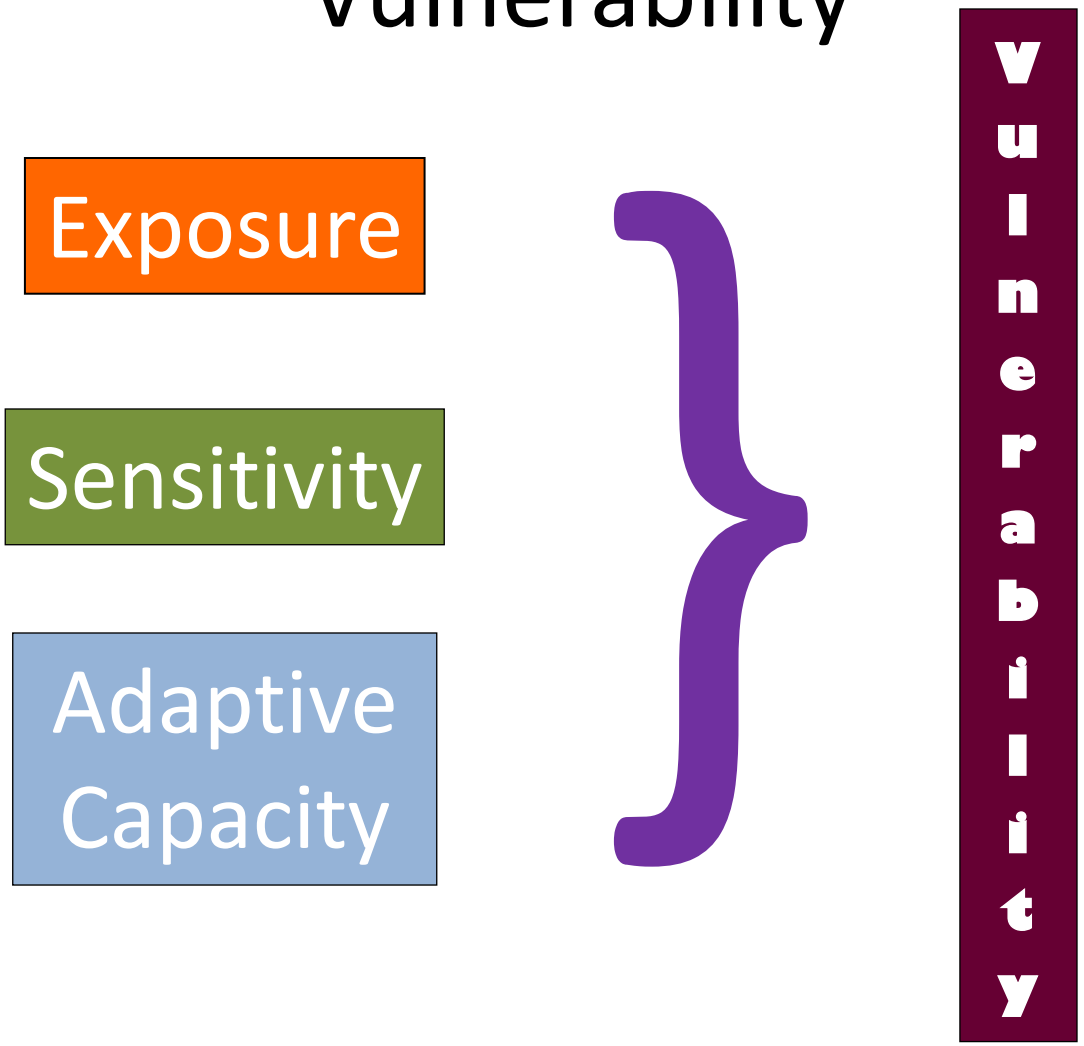


The Index in Use



April 2012

Lesson #1: The CCVI Helps Teach the Basics about Climate Change & Vulnerability



Index Scores

↓↓↓	Extremely Vulnerable
↓↓	Highly Vulnerable
↓	Moderately Vulnerable
≈	Not Vulnerable/Presumed Stable
↑	Not Vulnerable/Increase Likely
?	Insufficient Evidence

Factor Results

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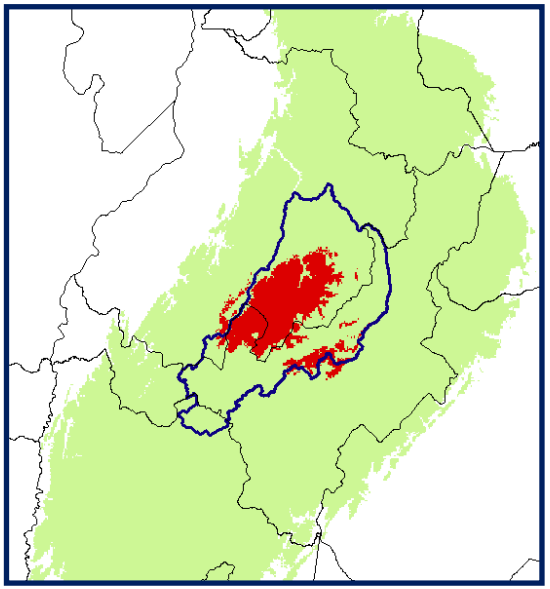
Species	Natl barriers B2a	Anth barriers B2b	CC mitigation B3	Dispersal/Movement C1	historical thermal niche C2ai	physiological thermal niche C2ai	historical hydrological niche C2bi	physiological hydrological niche C2bii	Disturbance C2c	Ice/snow C2d	Phys habitat C3	Other spp for hab C4a	Diet C4b	Pollinators C4c	Other spp disp C4d	Other spp interaction C4e	Genetic var C5a	Gen bottleneck C5b	Phenol response C6	Doc response D1	Modeled change D2	Modeled overlap D3	Protected Areas D4
Sclerocactus glaucus	N	N	SI	SI-N	N	N	SD	N	N	SI-N	N	N	N/A	SI	N	N	SI	N/A	U	U	U	U	U
Sclerocactus intertextus	SI	SI	Inc	N	N	N	Inc	SI	N	N	SI	N	N/A	SI	N	U	U	N	U	U	U	U	U
Sclerocactus johnsonii	N	N	Inc	N	N	N	SI	SI	N	N	SI	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus mesae-verdae	SI	N	SI	N	N	N	GI	SI	N	N	N	N	N/A	N	N	N	U	U	U	U	U	U	U
Sclerocactus nyensis	N	N	SI	N	N	N	Inc	SI	N	N	N	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus papyracanthus	SI	N	Inc	N	N	N	SI	SI	N	N	N	N	N/A	SI	N	N	U	SI-N	U	U	U	U	U
Sclerocactus parviflorus	Inc	N	SI	N	N	N	SI	SI	N	N	N	N	N/A	SI	N	N	SI-N	N/A	U	U	U	U	U
Sclerocactus polyancistrus	SI	N	Inc	N	N	N	Inc-SI	SI	N	N	N	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus pubispinus	N	N	SI	N	N	N	SI	SI	N	N	N	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus sileri	SI	N	Inc	N	N	N	N	SI	N	N	N	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus spinosior	SI	SI	Inc	N	N	N	N	SI	N	N	SI	N	N/A	SI	U	U	U	U	U	U	U	U	U
Sclerocactus uncinatus	N	N	Inc	N	N	N	SI	SI	N	N	SI-N	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus wetlandicus	Inc	N	SI	N	N	N	N	SI	N	N	N	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus whipplei	SI	N	SI	N	N	N	Inc	SI	N	N	N	N	N/A	SI	N	N	U	U	U	U	U	U	U
Sclerocactus wrightiae	N	Inc	SI	Inc	N	N	GI	SI	N	N	SI	N	N/A	SI	N	N	U	U	SI	U	U	U	U
Stenocereus thurberi	Inc	SI	Inc	N	N	N	SI	SI	U	N	N	SI	N/A	N	N	N	U	U	U	U	U	U	U

Lesson #2: Pay Attention to the Factor Scores

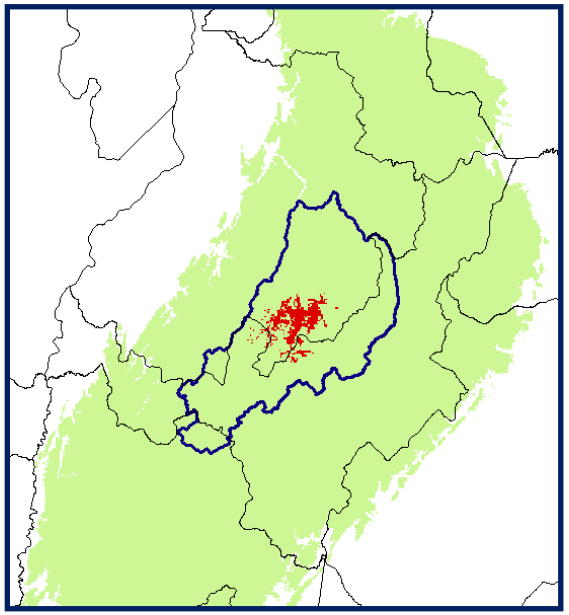
Cactus Species Occurring on BLM Lands

Next Step: Spatial Insights

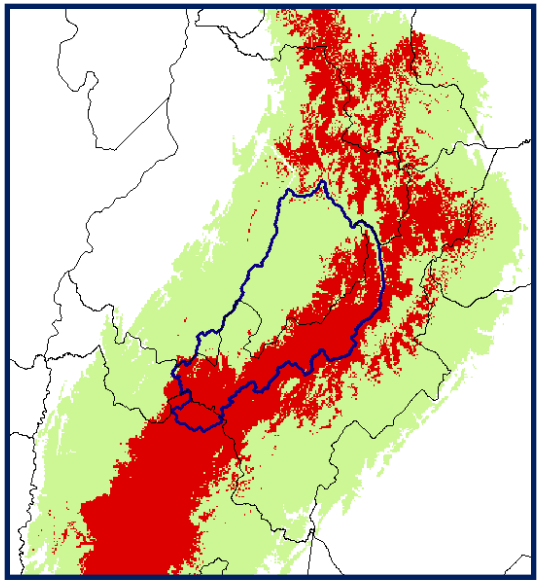
Current Distribution

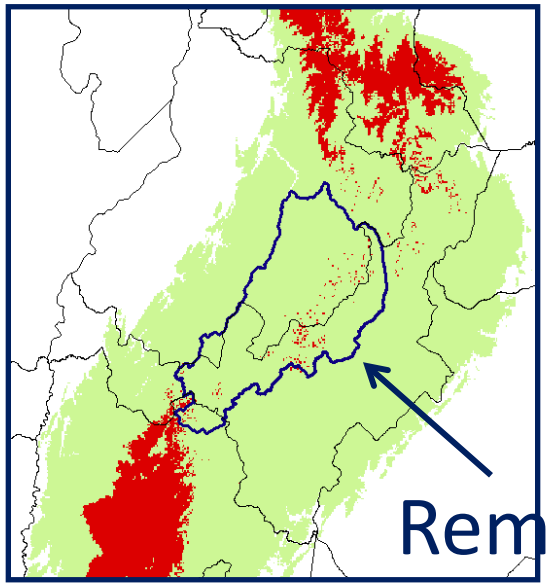


Predicted Future Distribution



Mecocerculus leucophrys





3%
Remaining

Current

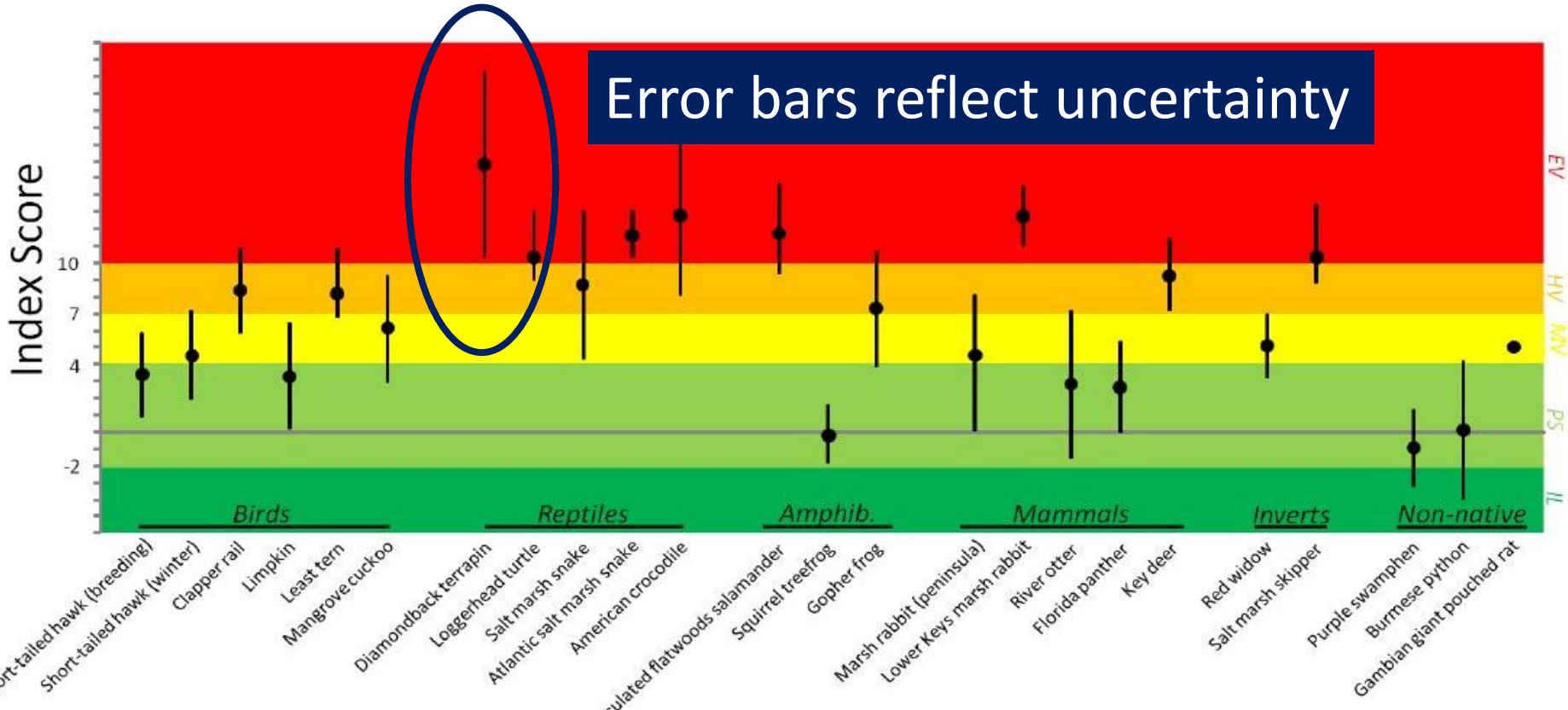
Predicted Future

BUT … This species scored **Not Vulnerable**

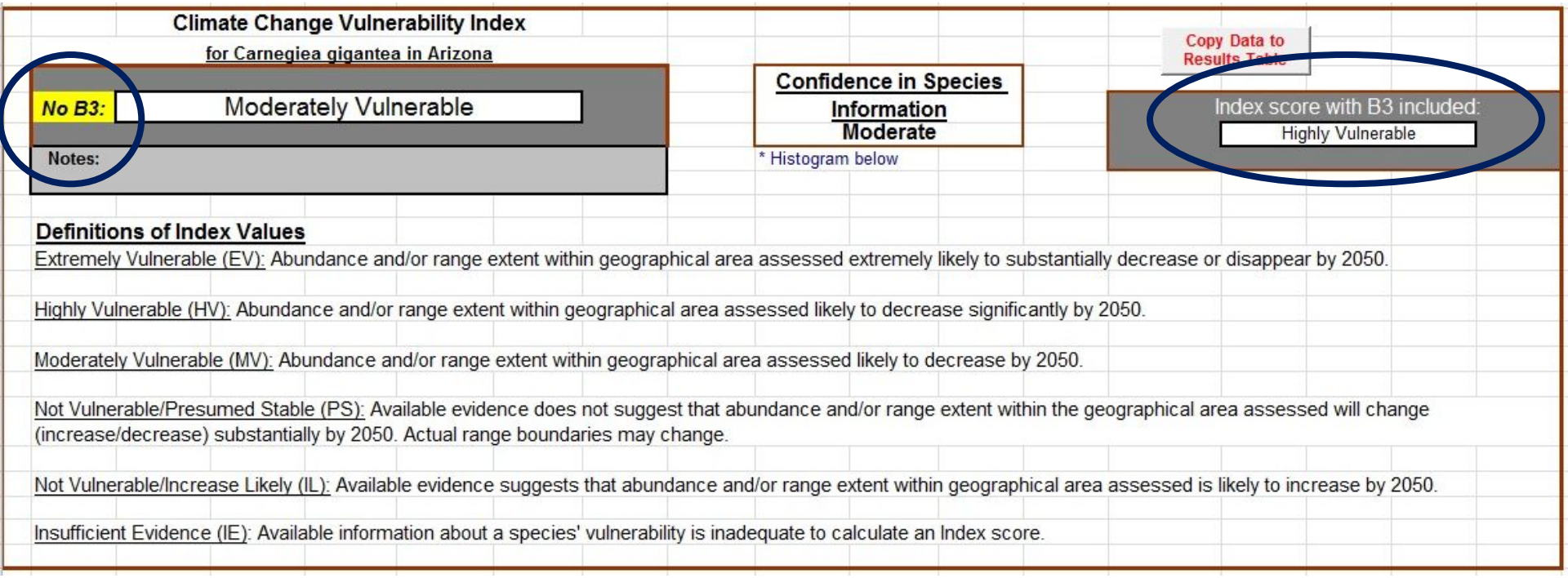
Lesson #3: Combine Trait & Spatial Approaches

Lesson #4: Screen with Trait Data, then Model

Florida: 24 species



Source: Defenders of Wildlife



Modification for project with the Bureau for Land Management

Lesson #5: Support Creativity to Address Users' Needs

Use of CCVI Results in Nevada

WESTERN GOVERNORS' ASSOCIATION

Serving the Governors of 19 States and 3 US-Flag Pacific Islands

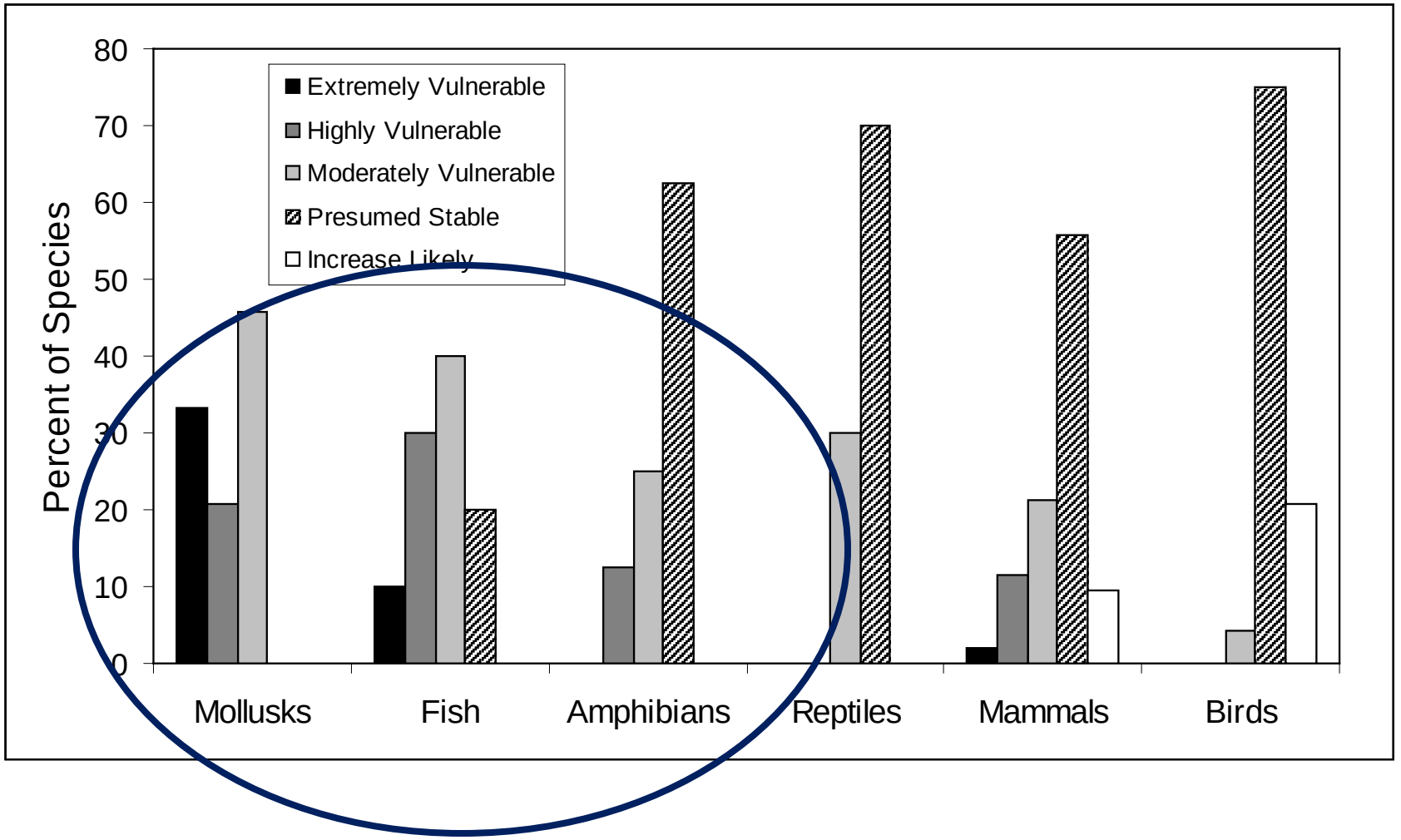
And in West Virginia

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

Central Appalachians Vulnerability Assessment - Climate Change Response Framework

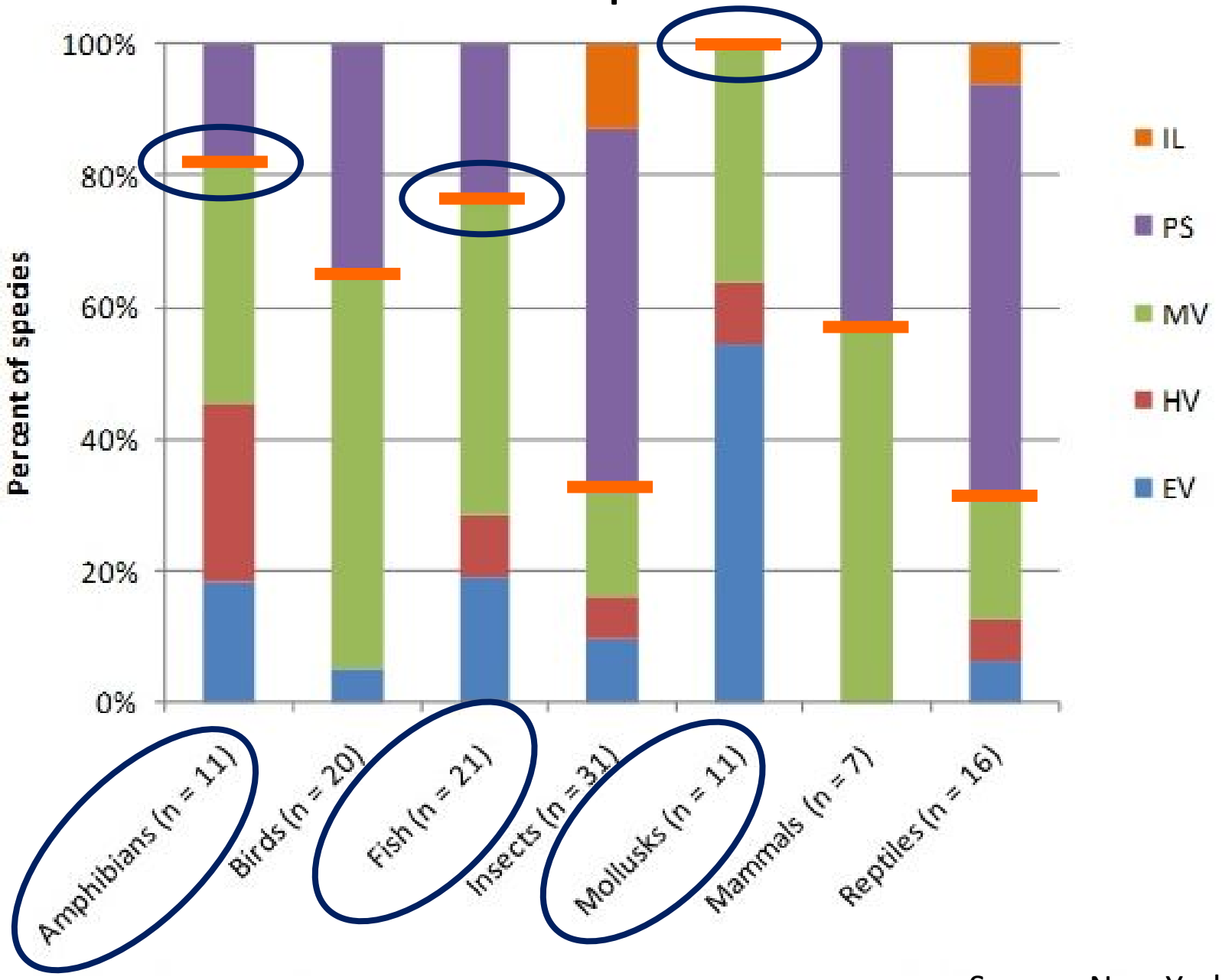
Lesson #6: CCVI Results Can Support Numerous Adaptation Processes

Nevada: 216 Species



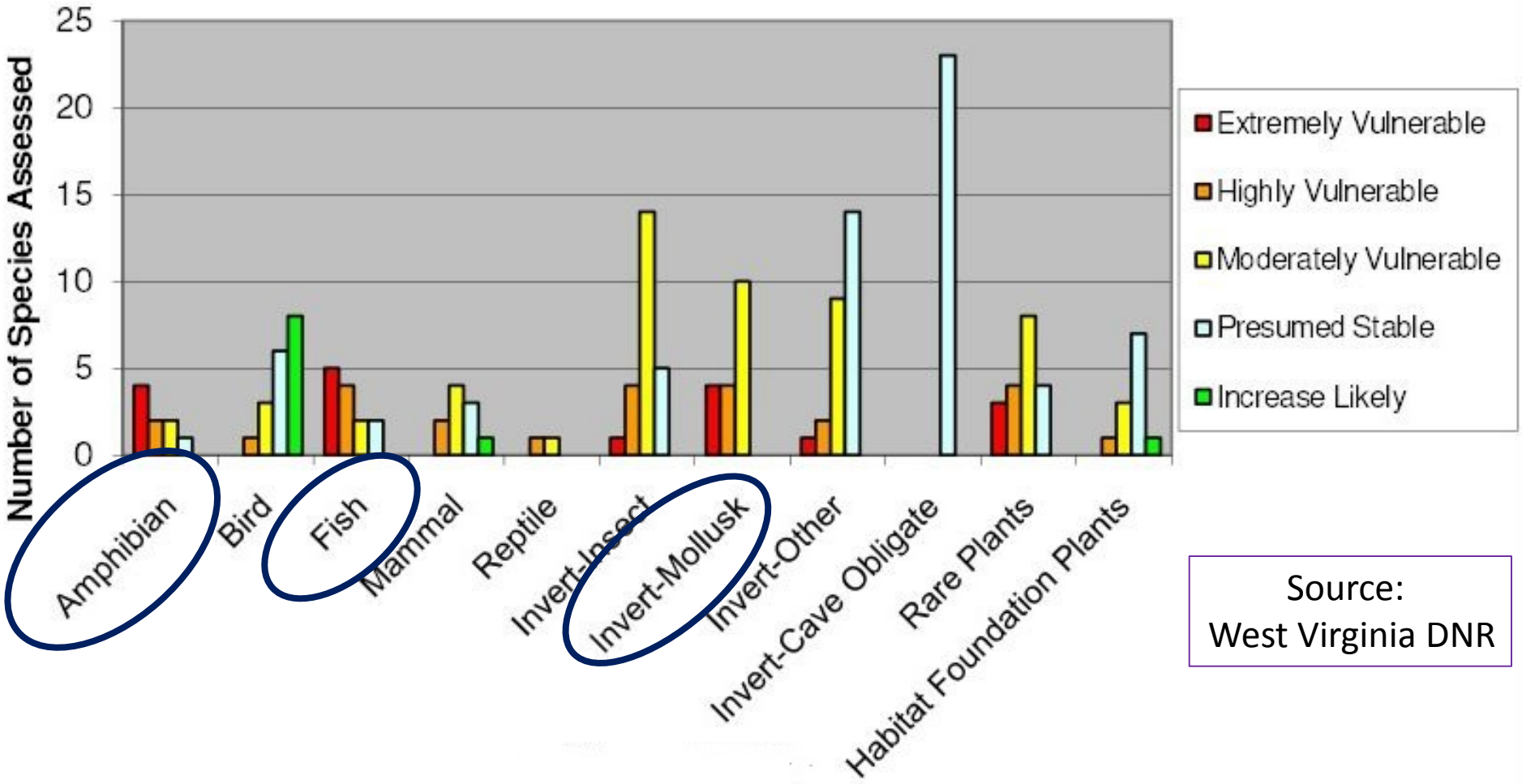
Source: Nevada NHP

New York: 117 species



Source: New York NHP

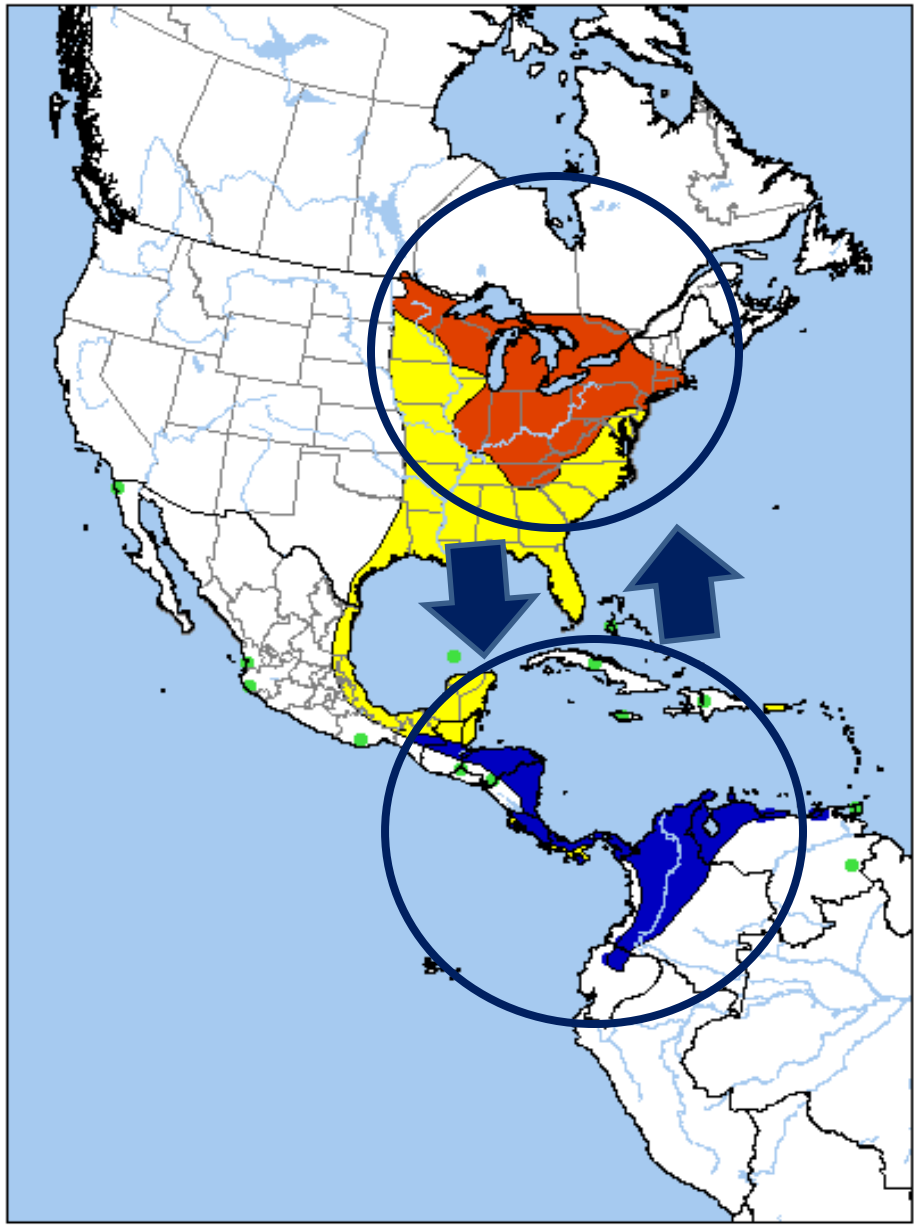
West Virginia: 185 species



Source:
West Virginia DNR

Lesson #7: Aquatic species tend to be vulnerable

© Michael Patrikeev



- Permanent Resident
- Breeding Resident
- Nonbreeding Resident
- Passage Migrant
- Uncertain Status
- Introduced
- Vagrant
- Extirpated
- Historical Records Only
- National boundary
- Subnational boundary
- River
- Water body

NatureServe

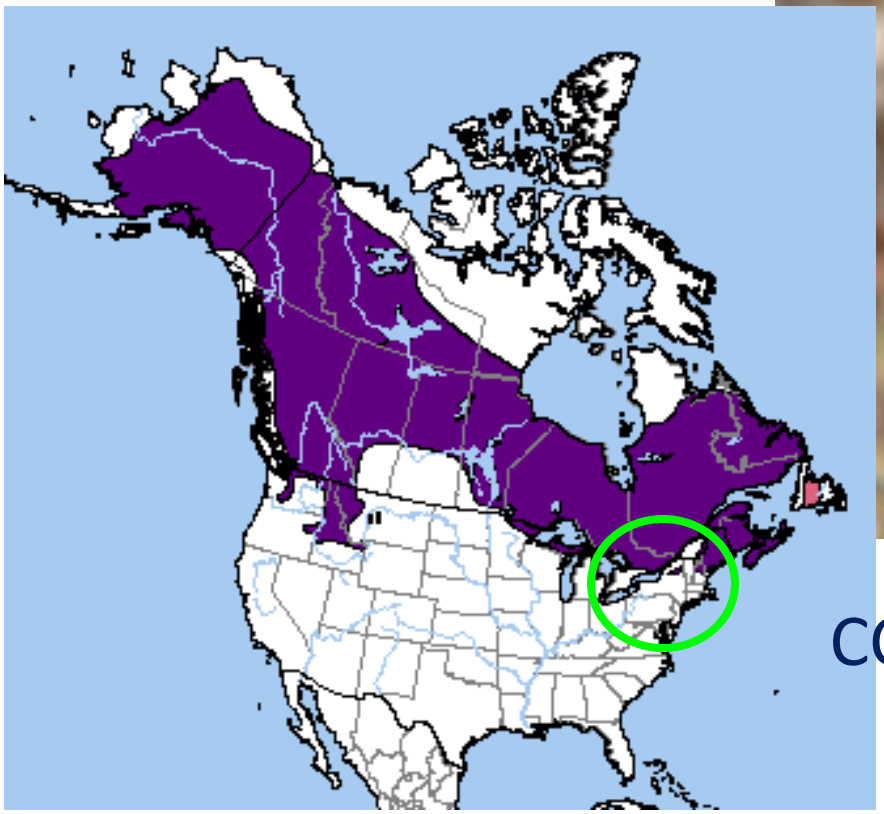
Map created September 2007

Lesson #8: Migratory Species Require Special Consideration

Focus on vulnerability within assessment area

or

Factor in effects of climate exposure on non-assessed migratory area



http://www.snydersgrousepark.com

CCVI Score (NY): Highly Vulnerable

Lesson #9: Some Results May be Unpopular

Summing Up

- Growing database of CCVI results
- CCVI results are useful in many adaptation contexts
- Useful in combination with other tools
- Future version to offer more options for migratory species

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